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C. Amendments to the Claims

Claim 1(Currently amended): A method for clock and carrier recovery at a receiver of a direct sequence spread spectrum communication system, the clock and carrier recovery being accomplished using a predefined training sequence, each symbol of the predefined training sequence being spread by a predefined spreading sequence, the predefined training sequence being transmitted on a channel by a transmitter, a signal corresponding to the transmitted training sequence being received by the receiver, the method comprising the steps of:

a. down-converting the received signal to convert it to a baseband ~~of the frequency spectrum~~ signal;

b. sampling the ~~down-converted~~ baseband signal at a ~~pre-defined~~ predefined sampling rate to obtain samples of the ~~received~~ baseband signal, wherein the sampled baseband signal comprises a plurality of symbols;

c. estimating ~~the~~ a symbol boundary using the samples of the ~~received~~ baseband signal;

d. computing ~~the~~ a maximum likelihood estimate of ~~the~~ a mean of ~~the~~ phase errors using the samples of the baseband signal with the estimated symbol boundary;

e. computing ~~the~~ a maximum likelihood estimate of ~~the~~ a carrier frequency offset using the maximum likelihood estimate of the mean of the phase errors; and

f. computing ~~the~~ a maximum likelihood estimate of ~~the~~ a clock error using the maximum likelihood estimate of the carrier frequency offset.

Claim 2(Currently amended): The method as recited in claim 1, wherein the step of computing the maximum likelihood estimate of the mean of the phase errors comprises the steps of:

~~a.~~ i. setting a value of a counter to ~~an initial value of~~ zero;

~~b.~~ ii. buffering M samples of the baseband signal with symbol boundary alignment, where M is a ~~pre-defined~~ predefined number;

~~c.~~ iii. decimating to retain N samples of the M buffered samples, where N is the length of ~~the pre-defined~~ the predefined spreading sequence;

~~d.~~ iv. de-spreading the decimated N samples of the ~~down-converted signal~~ M buffered samples using the ~~pre-defined~~ predefined spreading ~~code~~ sequence to obtain a ~~sequence of~~ de-spread symbols;

~~e.~~ v. forming a differential symbol using the de-spread symbols;

~~f.~~ vi. extracting ~~the~~ a phase angle of the differential symbol;

~~g.~~ vii. performing a symbol decision on the phase angle to extract a differential angle;

~~h.~~ viii. computing ~~the~~ a phase error introduced in the transmitted ~~signals~~ training sequence from the phase angle of the differential symbol and the differential angle;

~~i.~~ ix. accumulating the phase error;

~~j.~~ x. incrementing the value of the counter by unity; and

~~k.~~ xi. repeating steps ~~b-j~~ ii-x until the value of the counter reaches a value *L* to obtain the maximum likelihood estimate of the mean of the phase errors, *L* being ~~the~~ an estimation length in terms of ~~the~~ a number of Differential Binary Phase Shift Keying symbols.

Claim 3(Currently amended): The method as recited in claim 2 wherein the step of accumulating the phase error comprises accumulating the phase error using ~~the~~ a maximum likelihood weighting scheme.

Claim 4(Currently amended): A system for clock and carrier recovery at a receiver of a direct sequence spread spectrum communication system, the clock and carrier recovery being accomplished using a predefined training sequence, each symbol of the predefined training sequence being spread by a predefined spreading sequence, the predefined training sequence being transmitted on a channel by a transmitter, a signal corresponding to the transmitted training sequence being received by the receiver, the system comprising:

a. a ~~Down Converter~~ multiplier and Low Pass Filter (LPF) down-converting the received signal to a baseband ~~of the frequency spectrum~~ signal;

b. ~~a Sampler~~ an Analog to Digital Converter (ADC) sampling the baseband signal at a predefined sampling rate to obtain samples of the baseband signal; and

c. a ~~Symbol Boundary Estimator~~ maximum likelihood estimator, the maximum likelihood estimator configured for estimating a symbol boundary using the samples of the baseband signal, computing a maximum likelihood estimate of a mean of phase errors using the samples of the baseband signal with the estimated symbol boundary, computing a maximum likelihood estimate of a carrier frequency offset using the maximum likelihood estimate of the mean of the phase errors, and computing a maximum likelihood estimate of a clock error using the maximum likelihood estimate of the carrier frequency ~~estimating a symbol boundary using the samples of the received signal~~;

~~d. a Phase Error Estimator computing the maximum likelihood estimate of the mean of the phase error;~~

~~e. a Carrier Frequency Offset Estimator computing the maximum likelihood estimate of the carrier frequency offset; and~~

~~f. a Clock Error Estimator computing the maximum likelihood estimate of the clock error.~~

Claim 5(Cancelled).

Claim 6(Currently amended): A computer program product for clock and carrier recovery at a receiver of a direct sequence spread spectrum communication system, the clock and carrier recovery being accomplished using a predefined training sequence, each symbol of the predefined training sequence being spread by a

predefined spreading sequence, the predefined training sequence being transmitted on a channel by a transmitter, a signal corresponding to the transmitted training sequence being received by the receiver, the computer program product ~~comprising:~~ being disposed on a computer readable medium and comprising:

a. instruction means for down-converting the received signal to convert it to a baseband ~~of the frequency spectrum~~ signal;

b. instruction means for sampling the ~~down-converted~~ baseband signal at a ~~pre-defined~~ predefined sampling rate to obtain samples of the ~~received~~ baseband signal, wherein the sampled baseband signal comprises a plurality of symbols;

c. instruction means for estimating ~~the~~ a symbol boundary using the samples of the ~~received~~ baseband signal;

d. instruction means for computing ~~the~~ a maximum likelihood estimate of ~~the~~ a mean of ~~the~~ phase errors using the samples of the baseband signal with the estimated symbol boundary;

e. instruction means for computing ~~the~~ a maximum likelihood estimate of ~~the~~ a carrier frequency offset using the maximum likelihood estimate of the mean of the phase errors; and

f. instruction means for computing ~~the~~ a maximum likelihood estimate of ~~the~~ a clock error using the maximum likelihood estimate of the carrier frequency offset.

Claim 7(Currently amended) The computer program product as recited in claim 6 wherein the instruction means for computing the maximum likelihood estimate of the mean of the phase errors comprises:

~~a computer readable medium comprising:~~

~~a.~~ i. instruction means for setting a value of a counter to ~~an initial value of~~ zero;

~~b.~~ ii. instruction means for buffering *M* samples of the baseband signal with symbol boundary alignment, where *M* is a ~~pre-defined~~ predefined number;

~~c.~~ iii. instruction means for decimating to retain *N* samples of the *M* buffered samples, where *N* is the length of ~~the pre-defined~~ the predefined spreading sequence;

~~d.~~ iv. instruction means for de-spreading the decimated *N* samples of the ~~down-converted signal~~ *M* buffered samples using the ~~pre-defined~~ predefined spreading ~~code~~ sequence to obtain a ~~sequence of~~ de-spread symbols;

~~e.~~ v. instruction means for forming a differential symbol using the de-spread symbols;

~~f.~~ vi. instruction means for extracting ~~the~~ a phase angle of the differential symbol;

~~g.~~ vii. instruction means for performing a symbol decision on the phase angle to extract a differential angle;

~~h.~~ viii. instruction means for computing ~~the~~ a phase error introduced in the transmitted ~~signals~~ training sequence from the phase angle of the differential symbol and the differential;

~~i.~~ ix. instruction means for accumulating the phase error using ~~the~~ a maximum likelihood weighting scheme;

~~j.~~ x. instruction means for incrementing the value of the counter by unity; and

~~k.~~ xi. instruction means for repeating ~~steps~~ the instructions ~~b-j~~ ii-x until the value of the counter reaches a value *L* to obtain the maximum likelihood estimate of the mean of the phase errors, *L* being ~~the~~ an estimation length in terms of ~~the~~ a number of Differential Binary Phase Shift Keying symbols.